REMARKS

Applicant has carefully reviewed and considered the Office Action mailed on May 5, 2004, and the references cited therewith.

Claims 1, 7, 28 and 35 are amended, claims 8 and 34 are canceled, and no claims are added; as a result, claims 1-5, 7, 10-32, 35 and 37-54 are now pending in this application.

§102 Rejection of the Claims

Claims 1-2, 7-8, 28-29, and 34-35 were rejected under 35 USC § 102(b) as being anticipated by Sheehan et al. (U.S. Patent No. 5,533,085). Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration. *In re Dillon* 919 F.2d 688, 16 USPQ 2d 1897, 1908 (Fed. Cir. 1990) (en banc), cert. denied, 500 U.S. 904 (1991). It is not enough, however, that the prior art reference discloses all the claimed elements in isolation. Rather, "[a]nticipation requires the presence in a single prior reference disclosure of each and every element of the claimed invention, *arranged as in the claim*." *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 221 USPQ 481, 485 (Fed. Cir. 1984) (citing *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 220 USPQ 193 (Fed. Cir. 1983)) (emphasis added).

Claim 1 as amended recites "wherein selecting a subset of the images results from a determination of the blurriness of each image, wherein the blurriness of the image is determined by the mean pixel difference between the image and an adjacent image." The Examiner asserts that Sheehan uses the mean pixel difference between an image and an adjacent image to determine blurriness when Sheehan describes an algorithm for determining edges in an image using the difference between pixels in a row or column. However, Sheehan describes a technique very different than the mean pixel difference discussed by Applicant.

The technique is described by Sheehan in detail at col. 10, line 26 to col. 12, line 17. Generally, the image is divided into 8x8 pixel blocks. Each of the 8 columns and 8 rows in a block is processed to determine the number of edges in the column or row. Each column or row may have 0, 1 or 2 edges, so that an 8x8 pixel block has between 0 and 32 edges.

The number of edges in a column or row is determined by comparing the difference in gray scale values of three of the eight pixels in each column or row, generally the first, fifth and eighth pixels (labeled P_0, P_4 and P_7, respectively). The block diagram for this method is shown

clearly by Sheehan in Fig. 5. If the sign of the difference between the fifth pixel and the first pixel (P_4-P_0) is the same as that between the fifth pixel and eighth pixel (P_4-P_7), then the magnitude of these differences are examined. If the magnitude difference in grayscale value between the first pixel and fifth pixel ($|P_4-P_0|$) is more than a predetermined threshold value, the edge count is incremented by 1. If the magnitude difference in grayscale value between the fifth and eighth pixel ($|P_4-P_7|$) is more than the threshold value, then the edge count is incremented by 1. If the sign of the differences were not the same ($sgn[P_4-P_0] \neq sgn[P_4-P_7]$), then if the magnitude difference between first and eighth pixels ($|P_0-P_7|$) is greater than the threshold value the edge count is incremented by 1.

The edges for each row and column in a block are then summed to get a total for the block. The blocks are summed to get a total number of edges for the frame, also referred to as the total edge length.

The method taught by Applicant is much different. Applicant teaches that two adjacent images may be compared. The corresponding pixels in each image, usually those at the same x, y coordinates, are compared. The absolute value of the grayscale differences of the pixels are averaged across the entire image. The mean pixel difference taught by Applicant and discussed at p. 11, line 20 – p. 12, line 9 is therefore a measure of the change from one image to an adjacent image in the series of images. A large mean pixel difference may symbolize a dramatic change between the images, representing movement and blurriness.

The Examiner asserts that col. 14, lines 40-45 teaches finding a difference between frames. Applicant respectfully disagrees. The text referred to by the Examiner explains a method in which the threshold value used to determine whether an edge exists in a row or column may be determined. The method involves creating a histogram from a frame and then combining, not comparing, the histogram of three or more frames. This process does not describe comparing the frames or the pixels in a frame to the pixels in another frame. As with the rest of the algorithm described by Sheehan, only pixels in the same row or column of a single frame are compared.

In view of the above, Sheehan does not describe anything similar to the mean pixel difference between adjacent images described and claimed by Applicant. Claim 35 is a computer readable medium claim reciting the same mean pixel difference features as claim 1.

Claim 35 is believed to be allowable for the reasons discussed with respect to claim 1. Applicant respectfully requests the reconsideration and the withdrawal of the rejections of claims 1 and 35.

Claim 2 is dependant on claim 1 and therefore inherits the elements of claim 1 and adds further patentable distinctions. Claim 2 is therefore believed to be allowable for the same reasons as discussed above with respect to claim 1. Applicant respectfully requests the withdrawal of the rejection of claim 2.

Claim 7 recites that the blurriness "is determined by a Fourier transform applied to the image." Claim 28 recites similar language. The Office Action correctly states that Sheehan, at column 14, lines 58-63 applies a Fourier transform to an image. However, the Fourier transform in Sheehan is used as part of a DCT process to determine total edge length. Sheehan does not disclose using a Fourier transform to determine blurriness of an image. As a result, Sheehan does not teach or suggest each and every element of claims 7 and 28. Applicant respectfully requests reconsideration and the withdrawal of the rejection of claims 7 and 28

Claim 29 is dependant on claim 28 and therefore inherits the elements of claim 28 and adds further patentable distinctions. Claim 29 is therefore believed to be allowable for the same reasons as discussed above with respect to claim 28. Applicant respectfully requests the withdrawal of the rejection of claim 29.

Claims 10-13 and 37-40 were rejected under 35 USC § 102(e) as being anticipated by Heuscher et al. (U.S. Patent No. 6,510,337). Applicant respectfully submits that the Examiner did not make out a *prima facie* case of anticipation because the reference does not teach each and every element of the claims.

Claim 10 includes "deriving a cardiac cycle signal from the plurality of scanned images." The Examiner suggests that Heuscher discloses this limitation. Applicant respectfully disagrees.

Heuscher explains that:

> Because of the complex motion of the heart different parts of the heart cycle are affected differently with variations in the heart rate. That is to say, e.g., at progressively faster heart rates the diastole portion of the heart cycle becomes progressively shorter in length while the systole portion remains largely unchanged."

Col. 1, lines 48-53. Heuscher applies a dynamic algorithm based in part on observed characteristics of patient groups to accurately identify phases of the heart at varying heart rates.

Col. 5, lines 31-40. "The method includes monitoring a patient's cardiac cycle, and determining a cardiac cycle time for the patient." Col. 2, lines 4-6. "The parameter "rx" represents the instantaneous cardiac cycle time ... rx is calculated, determined or otherwise obtained from the ECG monitor." Col. 5, line 64 – col. 6, line 3.

The Examiner cites language describing the process of generating images in Heuscher to meet the limitation of a plurality of scanned images, and cites language in Heuscher that describes using an ECG monitor to meet the limitation of determining a cardiac cycle signal. The exact language of the Examiner is:

> ... the data acquired by the CT scanner 10 are processed by an image processor 50 and generates images ("preferable, of the patient's heart and/or surrounding anatomy") from the views or data lines and this information is being further processed by video processor 54 and send to display 56 for human-viewable format, See col. 4 lines 8-29. The ECG monitor also acquires EDG data from the patient 32 as seen in Fig. 1 and at col. 4 lines 29-34.

Office Action, p. 6, first paragraph. As is made clear in Heuscher and can be seen in this description, the cardiac cycle signal is derived from the ECG data, and not from the plurality of scanned images as recited in Applicant's claims.

In view of the above, Heuscher does not teach each element of Applicant's claim 10. Applicant believes that claim 10 is in condition for allowance. Claims 11-13 are dependant on claim 10 and are believed to be allowable for the same reasons discussed with respect to claim 10. Claim 37 is a computer readable medium claim with the same features as claim 10. The arguments addressed when discussing claim 10 are therefore equally applicable to claim 37 and its dependant claims 38-40. Applicant respectfully requests reconsideration and the withdrawal of all rejections of claims 10-13 and 37-40.

§103 Rejection of the Claims

In order for the Examiner to establish a *prima facie* case of obviousness, three base criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the

motivation to combine Sheehan and Hunziker. Sheehan describes selecting a subset of images. In contrast, Hunziker teaches away from Sheehan because Hunziker discloses using all the images and describes a way to view them easily. Applicant respectfully requests the withdrawal of the rejections of claims 5 and 32.

Claims 14 and 41 were rejected under 35 USC § 103(a) as being unpatentable over Heuscher in view of Hunziker. Claim 14 is dependant on claim 10 and claim 41 is dependant on claim 37. Claims 14 and 41 are believed to be allowable for the reasons discussed above with respect to claims 10 and 37. Furthermore, the combination of Heuscher and Hunziker does not teach the current invention. As discussed above, Heuscher relies on ECG data, and the combination of Heuscher with the cited reference does not teach the limitations of the current invention. There is also no motivation to combine Heuscher and Hunziker, because Heuscher is a method for organizing and selecting images, while Hunziker describes viewing every image in a convenient manner, and also being able to see the change in the images over time. Applicant requests the withdrawal of the rejections of claims 14 and 41.

Allowable Subject Matter

Applicant notes that claims 15-27 and 42-54 were objected to as being dependent upon a rejected base claim, but were indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. As argued above, Applicant believes that the base claims for claims 15-27 and 42-54 are also allowable. Therefore Applicant will defer rewriting claims 15-27 and 42-54 until their respective base claims have been reconsidered.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney (612) 373-6954 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743

Respectfully submitted,

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I hereby certify that this paper is being transmitted by facsimile to the U.S. Patent and Trademark Office on the date shown below.

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November 5, 2004
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